Understanding Breathing Air Systems

*To understand breathing air you **MUST** first understand the various types of NIOSH approved respirators available to meet the respiratory hazard.*

*All respirators are classified as either **Negative Pressure** or **Positive Pressure** Respirators.*

Negative Pressure Disposable Mask Respirator

The respirator wearer must inhale through the mask. Approved for dusts, mists, vapors and fumes.

Not approved for IDLH use. (Immediately Dangerous to Life or Health)

Negative Pressure Disposable Cartridge Respirator

This style of Respirator has replaceable cartridges or filters and comes in half mask or full face.
The respirator wearer must inhale through the filter cartridges.
Powered Air Purifying Respirators (PAPR) are a type of cartridge filtering respirator with a battery powered blower. They are approved for use where a filter cartridge is approved for the contaminant.

Note: Wearers must be fit tested to assure a proper face seal is achieved.

Not approved for IDLH use

Positive Pressure (Type-C) Airline Respirator - Constant Flow Hood Style

<u>All</u> constant flow respirators supply air continuously to maintain positive pressure inside the face piece or hood.

All airline respirators are classified by NIOSH as Type-C or Type-CE (approved for sandblasting).
Hood Style airline respirators are required by NIOSH to flow 6-15 cfm air flow per person.
Hoods are available in low pressure style for ambient air pumps, requiring 3-15 psi.
High pressure hoods, 25-110 psi, would require Grade-D breathing air provided by a Breather Box™.

No fit test is required with a hood style respirator

Not approved for IDLH use

Positive Pressure (Type-C) Airline Respirator - Constant Flow Mask

Positive Pressure respirators are available in half mask or full face and are required by NIOSH to flow 4-15 cfm per mask. They are available in low pressure style for ambient air pumps, requiring 3-15 psi. High pressure style, 25-110 psi, would require Grade-D breathing air provided by a Breather Box™. Constant flow respirators provide higher Protection Factors than air-purifying negative pressure respirators. They are not recommended for use with high pressure bottled air systems as they consume a lot of air.

Not approved for IDLH use

Positive Pressure (Type-C) Airline Respirator - Pressure Demand Style

Pressure Demand (PD) respirators supply air "on demand" and maintain a minimum positive pressure in the face piece at all times and required by NIOSH to flow 4-15cfm to the mask just like a constant flow style respirator. Pressure demand respirators provide a higher protection factor and can be used on high pressure cylinder air as well as low pressure filtration systems like a Breather Box™.

All PD respirators operate between 60-110 psi and require the use of Grade-D breathing air provided by a Breather Box™ or Grade-E cylinder air.

PD's with a five minute escape cylinder can be used in IDLH atmospheres

Respiratory Training
Breathing AIR Basics

Elements of a Type-C / CE Breathing Air System

Note: Type-C / CE is a NIOSH designation for an air supplied breathing air respirator system. All airline respirators are Type-C or Type-CE. CE designates an airline respirator approved for abrasive blasting.

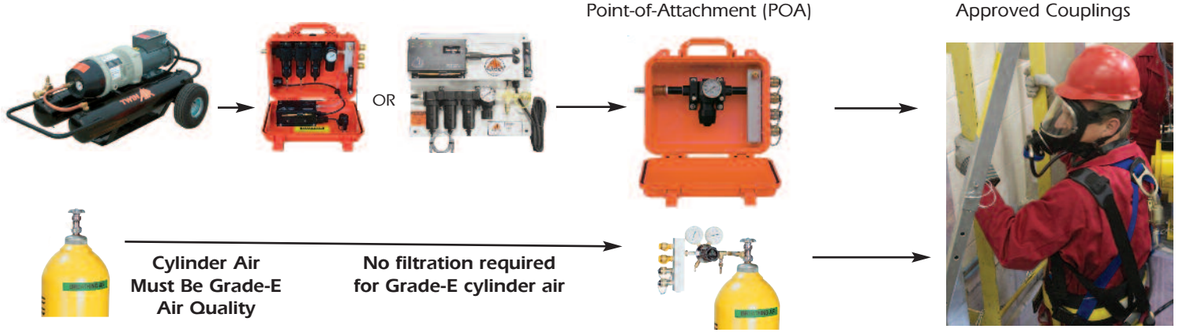
A Type-C system consists of the following components:

Compressed Air Source: Electric / Gas / Diesel Compressor or Compressed Air Cylinder →

Filtration Grade-D Breathing Air with Carbon Monoxide Monitoring (Portable or Fixed System) →

Air Distribution Consists of: Air Pressure Regulator, Pressure Gauge, Safety Relief Valve, and Approved Respirator Couplings. This assembly is what is called the Point-of-Attachment (POA) →

Respirator From the Point-Of-Attachment (POA), Maximum 300 Feet of NIOSH Approved Breathing Air Hose with Approved Couplings



Sizing a Type-C / CE Airline Filtration System

Sizing of the filtration system, determining what size Breather Box™ or panel to order, is based on the air flow (CFM) and pressure requirements (PSI) of the respirators being worn and the number of workers. Air Consumption (CFM) and Pressure (PSI) ranges for representative types of respirators are listed below:

Pressure Demand	4 - 15 cfm @ 60 - 120 psi
Constant Flow Half/Full Mask	4 - 15 cfm @ 4 - 30 psi
Constant Flow Hood (Low Pressure)	6 - 15 cfm @ 3 - 15 psi
Constant Flow Hood (High Pressure)	6 - 15 cfm @ 25 - 110 psi
Vortex Cooling Tube (Option)*	15 - 25 cfm @ 60 - 110 psi

***If a vortex cooling or heating tube is used by the worker, the total air consumed is calculated by the air consumption of the vortex device.**

Once the total number of workers are established and the type of respirator selected, multiply the number of workers by the maximum respirator flow rate required per worker, to determine total flow requirements:

Example: 4 workers using 4 hood style respirators
4 x 15 cfm = 60 cfm required

Note: System pressure (PSI) will be determined by the device requiring the highest pressure in the system.

Filtration recommended: Air Systems' BB50-CO Breather Box™, 4-workers, with CO monitor (maximum flow capacity of 79 cfm). User must have enough compressor flow (cfm) capacity to supply the above respirators, plus additional air needs placed on the system, i.e. air tools/spray nozzles.

When ordering a Breather Box™, the customer ***MUST*** specify the fittings used on the respirator selected. The Breather Box™ fittings must be the same type as the respirator hose fittings to maintain NIOSH approval on the respirator and hose assembly.

All Air Systems' filtration products are designed to flow the maximum amount of air a worker's respirator could demand. <u>*NEVER*</u> undersize a filtration system.